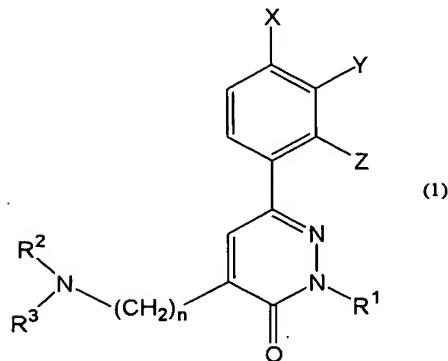


CLAIMS

1. A phenylpyridazine derivative represented by the formula (1):



wherein:

R^1 is optionally substituted or unsubstituted alkyl, or substituted or unsubstituted alkenyl;

R^2 and R^3 each independently represents hydrogen or alkyl, hydroxyalkyl, dihydroxyalkyl or alkynyl, or R^2 and R^3 are fused together with the adjacent nitrogen atom to form a substituted or unsubstituted, nitrogen-containing, saturated heterocyclic group;

X , Y and Z each independently represents hydrogen or halogen, substituted or unsubstituted alkyl, alkoxy, alkylthio, alkylsulfinyl or alkylsulfonyl, or substituted or unsubstituted aryl; and

n stands for a number of from 1 to 5;

with the proviso that R^2 and R^3 are not hydrogens or the same C_1-C_3 alkyl groups at the same time when R^1 is a benzyl

group or a C₁-C₃ alkyl group; or a salt thereof.

2. The compound of Claim 1, wherein R¹ is substituted or unsubstituted alkyl having 1 to 7 carbon atoms or substituted or unsubstituted alkenyl having 2 to 7 carbon atoms.

3. The compound of Claim 2, wherein one or more substituents on said alkyl or alkenyl represented by R¹ are each independently aryl having 6 to 14 carbon atoms or 5- or 6-membered heteroaryl having 1 to 3 nitrogen atoms; and said aryl or heteroaryl groups are each substituted or unsubstituted by 1 to 3 substituents selected from the group consisting of halogen, alkyl and alkoxy.

4. The compound of Claim 1, wherein R² and R³ each independently represents hydrogen, alkyl, hydroxyalkyl, dihydroxyalkyl or alkynyl; or R² and R³ are fused together with the adjacent nitrogen atom to form a 5- or 7-membered, nitrogen-containing, saturated heterocyclic group, said heterocyclic group being substituted or unsubstituted with one or more halogen atoms, or alkyl, alkoxy carbonyl or aralkyl groups.

5. The compound of Claim 1, wherein X, Y and Z are each independently hydrogen, halogen, alkyl which is substituted or unsubstituted by one or more halogen atoms or alkoxy groups, alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, or C₆-C₁₄ aryl which is substituted or unsubstituted by one or more halogen

atoms, or alkyl or alkoxy groups.

6. The compound of Claim 1, wherein R¹ is isobutyl, cyclopropylmethyl, cyclopentylmethyl, cinnamyl, halogenocinnamyl, benzyl, halogenobenzyl, dihalogenobenzyl or (halogenophenyl)propyl; R² and R³ are each independently hydrogen, C₁₋₇ alkyl, C₁₋₇ hydroxyalkyl or propargyl; said heterocyclic group formed by R² and R³ is pyrrolidinyl, piperazinyl, piperidino or morpholino which is substituted or unsubstituted by one or more C₁₋₇ alkyl or benzyl groups; X is methyl, methoxy, methylthio or halogen; Y is hydrogen, methyl or halogen; Z is hydrogen; and n is 1 or 3.

7. The compound of Claim 1, which is
4-dimethylaminomethyl-6-(3-fluoro-4-methylphenyl)-2-isobutyl-2H-pyridazin-3-one,
2-cyclopropylmethyl-4-dimethylaminomethyl-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,
2-cyclopropylmethyl-6-(3-fluoro-4-methoxyphenyl)-4-(4-benzyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-cyclopropylmethyl-6-(3-fluoro-4-methoxyphenyl)-4-(1-piperazinyl)methyl-2H-pyridazin-3-one,
4-N,N-bis(2-hydroxyethyl)aminomethyl-2-cyclopropylmethyl-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,
4-aminomethyl-2-cyclopropylmethyl-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,

4-dimethylaminomethyl-2-isobutyl-6-(4-methylphenyl)-2H-pyridazin-3-one,

4-diethylaminomethyl-2-isobutyl-6-(4-methylphenyl)-2H-pyridazin-3-one,

4-N,N-bis(2-hydroxyethyl)aminomethyl-6-(4-methylphenyl)-2-isobutyl-2H-pyridazin-3-one,

6-(4-fluoro-3-methylphenyl)-2-isobutyl-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

4-dimethylaminomethyl-6-(4-fluoro-3-methylphenyl)-2-isobutyl-2H-pyridazin-3-one,

4-N,N-bis(2-hydroxyethyl)aminomethyl-6-(3,4-difluorophenyl)-2-isobutyl-2H-pyridazin-3-one,

2-(4-chlorocinnamyl)-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

2-cyclopropylmethyl-4-(4-methyl-1-piperazinyl)methyl-6-[4-(methylthio)phenyl]-2H-pyridazin-3-one,

4-N,N-bis(2-hydroxyethyl)aminomethyl-2-cyclopropylmethyl-6-[4-(methylthio)phenyl]-2H-pyridazin-3-one,

2-cyclopropylmethyl-4-dimethylaminomethyl-6-[4-(methylthio)phenyl]-2H-pyridazin-3-one,

2-isobutyl-6-[4-(methylthio)phenyl]-4-propargylaminomethyl-2H-pyridazin-3-one,

4-dimethylaminomethyl-2-isobutyl-6-[4-(methylthio)phenyl]-2H-pyridazin-3-one,

2-(4-chlorobenzyl)-4-dimethylaminomethyl-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,
2-cyclopentylmethyl-6-(3-fluoro-4-methoxyphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-cyclopentylmethyl-4-dimethylaminomethyl-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,
2-cyclopentylmethyl-6-(3-fluoro-4-methoxyphenyl)-4-(1-piperazinyl)methyl-2H-pyridazin-3-one,
4-aminomethyl-2-cyclopentylmethyl-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,
2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxyphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
4-dimethylaminomethyl-2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,
2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxyphenyl)-4-(1-piperazinyl)methyl-2H-pyridazin-3-one,
4-aminomethyl-2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,
4-aminomethyl-2-(4-chlorobenzyl)-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,
2-(3,4-difluorobenzyl)-6-(3-fluoro-4-methoxyphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(3,4-difluorobenzyl)-4-dimethylaminomethyl-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,

6-(3-fluoro-4-methoxyphenyl)-2-[3-(4-fluorophenyl)propyl]-
4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
4-dimethylaminomethyl-6-(3-fluoro-4-methoxyphenyl)-2-[3-(4
-fluorophenyl)propyl]-2H-pyridazin-3-one,
4-N,N-bis(2-hydroxyethyl)aminomethyl-6-(3-fluoro-4-methoxy
phenyl)-2-[3-(4-fluorophenyl)propyl]-2H-pyridazin-3-one,
6-(3-fluoro-4-methoxyphenyl)-2-[3-(4-fluorophenyl)propyl]-
4-(1-piperazinyl)methyl-2H-pyridazin-3-one,
4-aminomethyl-6-(3-fluoro-4-methoxyphenyl)-2-[3-(4-fluorop
henyl)propyl]-2H-pyridazin-3-one,
2-(4-chlorocinnamyl)-6-(3-fluoro-4-methoxyphenyl)-4-[4-(2-
hydroxyethyl)-1-piperazinyl]methyl-2H-pyridazin-3-one,
2-(4-chlorocinnamyl)-6-(3-fluoro-4-methoxyphenyl)-4-(4-met
hyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-cyclopropylmethyl-6-(3-fluoro-4-methoxyphenyl)-4-[3-(4-m
ethyl-1-piperazinyl)propyl]-2H-pyridazin-3-one,
2-cyclopropylmethyl-4-(3-dimethylaminopropyl)-6-(3-fluoro-
4-methoxyphenyl)-2H-pyridazin-3-one,
2-cyclopropylmethyl-6-(3-fluoro-4-methoxyphenyl)-4-[3-(1-p
iperazinyl)propyl]-2H-pyridazin-3-one, or
4-(3-aminopropyl)-2-cyclopropylmethyl-6-(3-fluoro-4-methox
yphenyl)-2H-pyridazin-3-one; or a salt thereof.

8. The compound of Claim 1, wherein R¹ is a group selected
from halogenobenzyl, dihalogenobenzyl, (halogenophenyl)ethyl,

(dihalogenophenyl)ethyl, (halogenophenyl)propyl or (dihalogenophenyl)propyl; R²(R³)N- is a group selected from amino, dimethylamino, piperazinyl or N-methylpiperazinyl; X is halogen or methoxy; Y is methyl or halogen; Z is hydrogen; and n stands for 1 or 3.

9. The compound of Claim 1, wherein R¹ is a group selected from chlorobenzyl, dichlorobenzyl, fluorobenzyl, difluorobenzyl, (chlorophenyl)ethyl, (dichlorophenyl)ethyl, (chlrorophenyl)propyl or (dichlorophenyl)propyl; R²(R³)N- is a group selected from amino, dimethylamino, piperazinyl or N-methylpiperazinyl; X is halogen or methoxy; Y is methyl or halogen; Z is hydrogen; and n stands for 1 or 3.

10. The compound of Claim 1, which is:

2-[3-(4-chlorophenyl)propyl]-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-[3-(2-chlorophenyl)propyl]-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-[3-(3-chlorophenyl)propyl]-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(4-chlorobenzyl)-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(2-chlorobenzyl)-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(2-chlorobenzyl)-6-(4-fluoro-3-methylphenyl)-4-[3-

(4-methyl-1-piperazinyl)propyl]-2H-pyridazin-3-one,
4-(3-aminopropyl)-2-(2-chlorobenzyl)-6-(4-fluoro-3-methylphenyl)-2H-pyridazin-3-one,
2-[2-(2-chlorophenyl)ethyl]-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-[2-(4-chlorophenyl)ethyl]-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(2,6-dichlorobenzyl)-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(2,6-dichlorobenzyl)-6-(4-fluoro-3-methylphenyl)-4-(1-piperazinyl)methyl-2H-pyridazin-3-one,
4-aminomethyl-2-(2,6-dichlorobenzyl)-6-(4-fluoro-3-methylphenyl)-2H-pyridazin-3-one,
2-[3-(2,6-dichlorophenyl)propyl]-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(3,4-difluorobenzyl)-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
4-aminomethyl-2-(2-chlorobenzyl)-6-(4-fluoro-3-methylphenyl)-2H-pyridazin-3-one,
2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxyphenyl)-4-[3-(4-methyl-1-piperazinyl)propyl]-2H-pyridazin-3-one,
2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxyphenyl)-4-[3-(1-piperazinyl)propyl]-2H-pyridazin-3-one,

2-[3-(2-chlorophenyl)propyl]-6-(3-fluoro-4-methoxylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one

2-[3-(4-chlorophenyl)propyl]-6-(3-fluoro-4-methoxylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one

4-aminomethyl-2-[3-(2-chlorophenyl)propyl]-6-(3-fluoro-4-methoxylphenyl)-2H-pyridazin-3-one,

4-aminomethyl-2-[3-(4-chlorophenyl)propyl]-6-(3-fluoro-4-methoxylphenyl)-2H-pyridazin-3-one,

2-cyclopropylmethyl-6-(3-fluoro-4-methoxylphenyl)-4-[3-(1-piperazinyl)propyl]-2H-pyridazin-3-one,

4-(3-aminopropyl)-2-cyclopropylmethyl-6-(3-fluoro-4-methoxylphenyl)-2H-pyridazin-3-one,

2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxylphenyl)-4-(1-piperazinyl)methyl-2H-pyridazin-3-one,

2-(3,4-difluorobenzyl)-6-(3-fluoro-4-methoxylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

2-(3,4-difluorobenzyl)-4-dimethylaminomethyl-6-(3-fluoro-4-methoxylphenyl)-2H-pyridazin-3-one,

2-(4-chlorocinnamyl)-6-(3-fluoro-4-methoxylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

2-(4-chlorocinnamyl)-6-(3-fluoro-4-methoxylphenyl)-4-[4-(2-hydroxyethyl)-1-piperazinyl]methyl-2H-pyridazin-3-one,

4-N,N-bis(2-hydroxyethyl)aminomethyl-2-cyclopropylmethy-
l-6-(3-fluoro-4-methoxylphenyl)-2H-pyridazin-3-one,

4-aminomethyl-2-cyclopropylmethyl-6-(3-fluoro-4-meth-
oxylphenyl)-2H-pyridazin-3-one, or

2-(4-chlorocinnamyl)-6-(4-fluoro-3-methylphenyl)-4-(
4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one; or
a salt thereof.

11. The compound of Claim 1, which is

2-[3-(4-chlorophenyl)propyl]-6-(4-fluoro-3-methylphenyl)-4-
-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

2-(4-chlorobenzyl)-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-
-1-piperazinyl)methyl-2H-pyridazin-3-one,

4-(3-aminopropyl)-2-(2-chlorobenzyl)-6-(4-fluoro-3-methylphenyl)-2H-pyridazin-3-one,

2-[2-(4-chlorophenyl)ethyl]-6-(4-fluoro-3-methylphenyl)-4-(
4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

2-(2,6-dichlorobenzyl)-6-(4-fluoro-3-methylphenyl)-4-(4-me-
thyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

2-[3-(2-chlorophenyl)propyl]-6-(3-fluoro-4-methoxylphenyl)-
-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

2-[3-(4-chlorophenyl)propyl]-6-(3-fluoro-4-methoxylphenyl)-

-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-cyclopropylmethyl-6-(3-fluoro-4-methoxylphenyl)-4-[3-(1-piperazinyl)propyl]-2H-pyridazin-3-one,
4-(3-aminopropyl)-2-cyclopropylmethyl-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,
2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxylphenyl)-4-(1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(3,4-difluorobenzyl)-6-(3-fluoro-4-methoxylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(3,4-difluorobenzyl)-4-dimethylaminomethyl-6-(3-fluoro-4-methoxylphenyl)-2H-pyridazin-3-one,
2-(4-chlorocinnamyl)-6-(3-fluoro-4-methoxylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,
2-(4-chlorocinnamyl)-6-(3-fluoro-4-methoxylphenyl)-4-[4-(2-hydroxyethyl)-1-piperazinyl]methyl-2H-pyridazin-3-one,
4-N,N-bis(2-hydroxyethyl)aminomethyl-2-cyclopropylmethyl-6-(3-fluoro-4-methoxylphenyl)-2H-pyridazin-3-one,
4-aminomethyl-2-cyclopropylmethyl-6-(3-fluoro-4-methoxylphenyl)-2H-pyridazin-3-one, or
2-(4-chlorocinnamyl)-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one; or a salt thereof.

12. The compound of Claim 1, which is

2-(3,4-difluorobenzyl)-4-dimethylaminomethyl-6-(3-fluoro-4-methoxyphenyl)-2H-pyridazin-3-one,

2-(4-chlorocinnamyl)-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

2-(4-fluorobenzyl)-6-(3-fluoro-4-methoxyphenyl)-4-(1-piperazinyl)methyl-2H-pyridazin-3-one,

2-[3-(4-chlorophenyl)propyl]-6-(4-fluoro-3-methylphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one,

2-(4-chlorocinnamyl)-6-(3-fluoro-4-methoxyphenyl)-4-(4-methyl-1-piperazinyl)methyl-2H-pyridazin-3-one, or

2-(4-chlorocinnamyl)-6-(3-fluoro-4-methoxyphenyl)-4-[4-(2-hydroxyethyl)-1-piperazinyl]methyl-2H-pyridazin-3-one; or a salt thereof.

13. A medicine comprising as an active ingredient the compound of any one of claims 1-12 or a salt thereof.

14. The medicine of claim 13, which is a preventive or therapeutic for a disease caused by stimulation of interleukin-1 β production.

15. The medicine of claim 13, which is a preventive or therapeutic for immune system diseases, inflammatory diseases, ischemic diseases, osteoporosis, or ichorrhemia.

16. The medicine of claim 13, which is a preventive or therapeutic for rheumatism, arthritis or inflammatory colitis.

17. An interleukin-1 β production inhibitor comprising as an active ingredient the compound of any one of claims 1-12 or a salt thereof.

18. A pharmaceutical composition comprising the compound of any one of claims 1-12 or a salt thereof and a pharmacologically acceptable carrier.

19. The pharmaceutical composition of claim 18, which is a pharmaceutical composition for the prevention or treatment of a disease caused by stimulation of interleukin-1 β production.

20. The pharmaceutical composition of claim 18, which is a pharmaceutical composition for the prevention or treatment of immune system diseases, inflammatory diseases, ischemic diseases, osteoporosis, or ichorrhemia.

21. The pharmaceutical composition of claim 18, which is a pharmaceutical composition for the prevention or treatment of rheumatism, arthritis or inflammatory colitis.

22. Use of the compound of any one of claims 1-12 or a salt thereof for the production of a medicine.

23. A method for treating a disease caused by stimulation of interleukin-1 β production, which comprises administering the compound of any one of Claims 1-12 or a salt thereof.